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ABSTRACT

This study investigated children's developmental differences in adopting a clustering strategy while studying items for later recall. The central focus was on developmental differences in the efficient use of study strategies, rather than clustering in recall per se. Twenty-four third- and fifth-graders and 12 college students were given a series of study and recall trials using pictures from the Peabody Picture Vocabulary Test. Each trial consisted of a 45-second study period followed by recall. Prior to recall on trials 2, 3, and 4, each subject was allowed to select one-third of the items for study. It was found that the clustering of items selected by the individual for study was an effective recall strategy for all three age groups. (CS)

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Developmental Changes in Apportionment of Study Time Among Clustered Items in a Multitrial Free Recall Task

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In a previous study by Masur, McIntyre, and Flavell (1973) first grade, third grade, and college students were asked to memorize a single set of items over the course of 5 trials. Each trial consisted of a 45 second study period followed by a free recall test. On all trials but the first, S was allowed to have available during his study period, only half of the total set of items. However, the subject was allowed to select any item he wished to include in his half. Third grade and college subjects were significantly more inclined than first grade subjects to select for study items not recalled during the immediately preceeding recall test. The investigators concluded that children must learn the strategy of deliberately concentrating one's study activities on the less well mastered items. Thus, elementary memory strategies cannot automatically be assumed to be a part of a young child's repertoire of learning techniques.

Another strategy that may be used in studying materials for free recall is making use of semantic similarities, or as it is commonly called, making use of clustering. Previous research has shown that the use of such a clustering strategy may undergo developmental changes. Horowitz (1973) found that kindergarten and third grade children displayed very little spontaneous categorical clustering. However, when these children were provided with storage cues and retrieval cues, the amount of clustering observed during recall increased dramatically. This increase in recall clustering was accompanied by an increase in the total number of items recalled. Young children, then, do not seem to have adopted

a cluster strategy for recall, and yet, when provided with clustering cues, do benefit in recall performance.

The present study investigated whether young children will adopt a clustering strategy in studying items to be recalled later. The efficiency, in terms of later recall performance was analyzed. In contrast to Horowitz's study, the subjects in our study did not get either storage or retrieval cues.

The memory task for all subjects was to recall items from 6 experimenter generated categories (e.g., groups of animals, clothing, or vegetables). Preceeding the second, third, and fourth recall trials, the subjects were allowed to select 1/3 of the items for study. Our central interest was to see whether, if given the opportunity, subjects would select clusters of items for study that had not been recalled previously. Recall performance was measured but it must be emphasized that the central interest for the present study was on developmental differences in the efficient use of study strategies, rather than clustering in recall.

Method

Subjects

Twenty-four children, 12 third graders (mean age 8.6 years old) and 12 fifth graders (mean age 11.2 years) were obtained from a local, middle class elementary school. The children were above average in academic ability so an adequate comparison could be made with 12 college students (mean age 19.0 years).

Procedure

The selections for study and the recalled items were recorded by means of a tape recorder. Subjects were tested individually.

A warm up task was used to make sure subjects understood the experimental task. The warm up task involved E showing the subject fifteen common trinkets (e.g., a whistle, ball, etc.) for 20 seconds, and then covering them, and asking S to recall them. After recall S was allowed to select 7 items for study. E emphasized that after studying these 7 items, S would have to recall all of the items. Usually, recall periods lasted until S decided he could not recall any more items.

The experimental task was similar to the warm-up task except that pictures from the Peabody Picture Vocabulary Test were used and more study and recall trials were given. The same set of cards, randomly arranged, was presented to the subject before each study trial. Each trial consisted of a 45 second study period followed by recall. Prior to recall on trials 2, 3, and 4, each subject was allowed to select 1/3 of the items for study.

Results and Discussion

The results for recall performance will be presented and discussed briefly, followed by a more detailed presentation of the selection for study performance.

Clustering in both recall and selection was assessed by using the adjusted ratio of clustering developed by Roenker, Thompson, and Brown (1971). Total clustering is indicated by a 1.00 while chance clustering is indicated by .00. All statements of significance made in the present paper are based upon the results of analysis of variance with F values that reach the .05 level.

As expected, the college students recalled significantly

more items than did the third and fifth graders. All three groups improved across trials with college students showing the most improvement. The same pattern was found for the percentage of possible items recalled across trials.

NOTE:--Figure 1 on the second page of your handout shows the incidence of clustering during recall. All groups clustered over half the items recalled, with college students showing significantly more clustering than 3rd and fifth graders. Evidently, the college subjects were more sensitive to the categories and used the mnemonic in storage and retrieval process.

Let us now turn to the selection strategies to see what items the different age groups picked for study.

The groups did not differ in the proportion of items which were not recalled but were selected for study. This agrees with the results reported by Masur et al., where only 1st graders were significantly below 3rd grade and college subjects in selecting missed items for study.

In addition, Figure 2 shows that college students were significantly more efficient in recalling items previously missed that had been selected for study.

Now we want to look at a subset of these items, i.e., those that were not previously recalled and were selected for study. Did the three age groups cluster these items that they selected for study?

In Figure 3 a surprising result is seen for the proportion of items previously missed that were selected for study and clustered. There was no significant difference in clustering items selected for study between the three groups. And there

was no difference across trials for the three age groups. This is surprising because college students made greater use of clustering in recall as was shown in Figure 1. But their clustering during selection of items for study was equivalent to that of both the 3rd and the fifth grade subjects.

The next step in looking at the use of the clustering strategy was the item recalled after study . Figure 4 reveals the efficiency in recalling items that had been selected for study, were clustered, and not previously recalled. There was no difference for grade or trials. That is, 3rd and fifth graders were just as efficient as college students in recalling items that were studied and clustered. However, if you go back to Figure 2 you can see that college students use the strategy of studying previously missed items much more efficiently.

The reason for this difference is revealed in Figure 5. In this figure we see that college students were more efficient in recalling items that were studied but not clustered in the study selection.

In conclusion, a previous study by Masur, McIntyre, and Flavell showed that selecting items for study that were not previously recalled was a basic strategy employed by third graders, although it was not very efficient. However, as shown by this investigation, if items to be remembered are studied in clusters, clusters picked by the student themselves, this strategy becomes highly efficient. In fact, 3rd and fifth grade subjects were as efficient as college subjects.

Thus the use of clustering is a more basic and efficient strategy than studying previously missed items. That is, the salience of clustering items may serve as an external guide for subject's study strategy whereas no external cues are available for selecting the missed item strategy.

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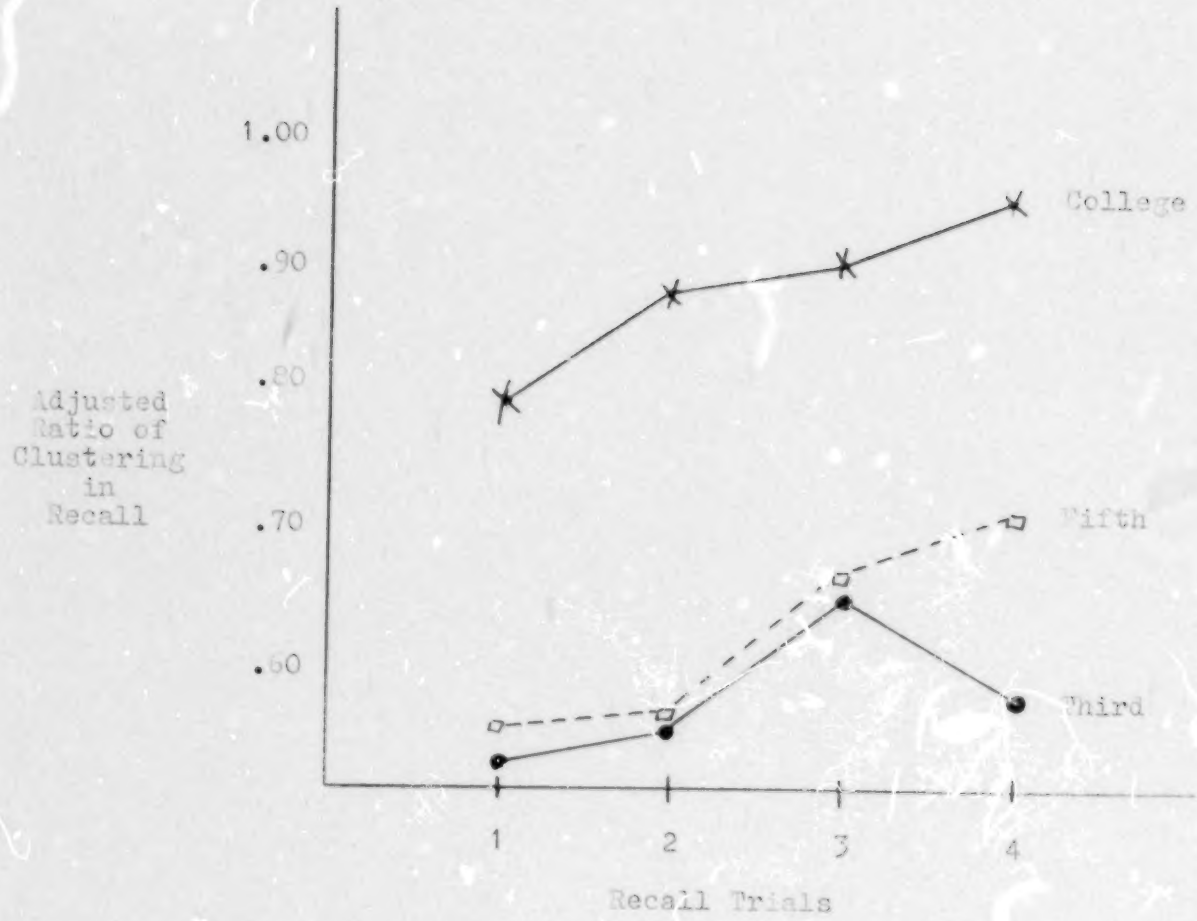

Figure 1 Amount of clustering in free recall

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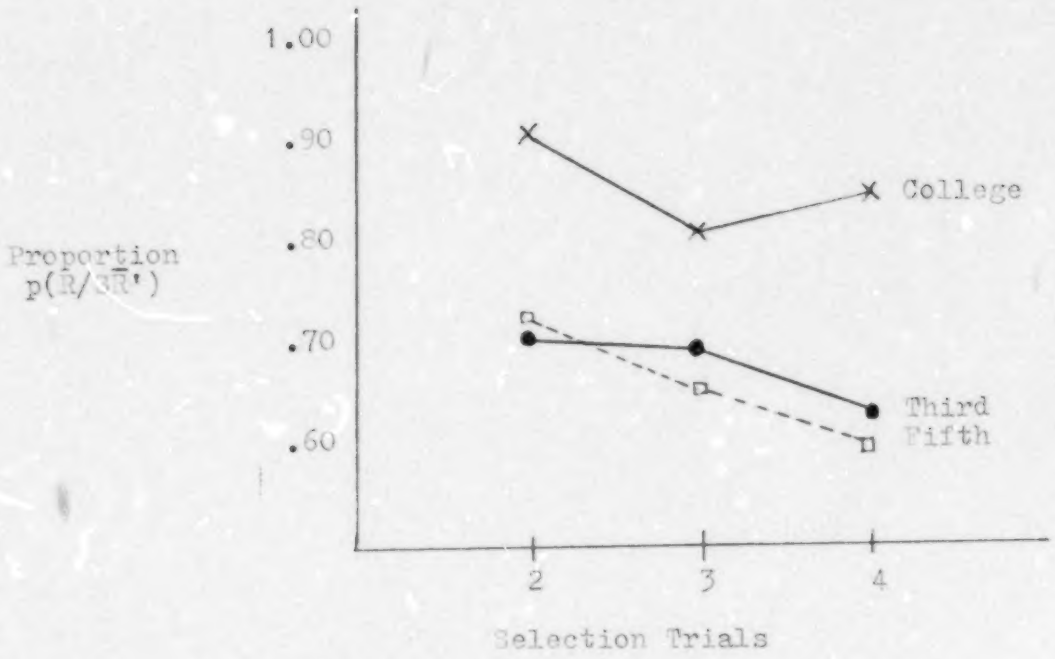

Figure 2 Efficiency of recall in studying previously missed items

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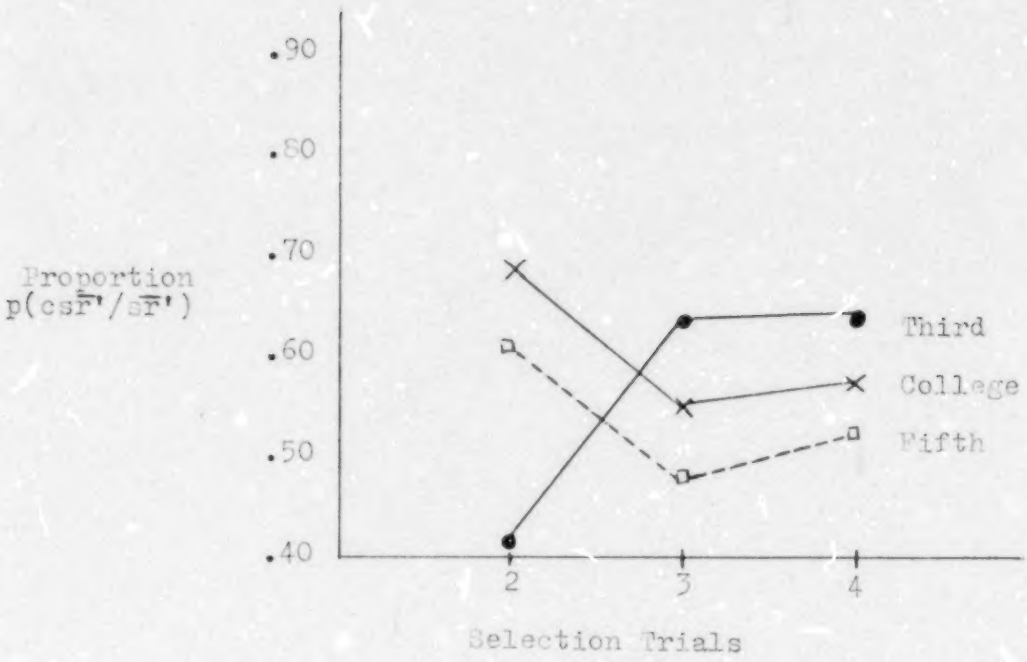

Figure 3 Proportion of previously missed items that were clustered during study selection

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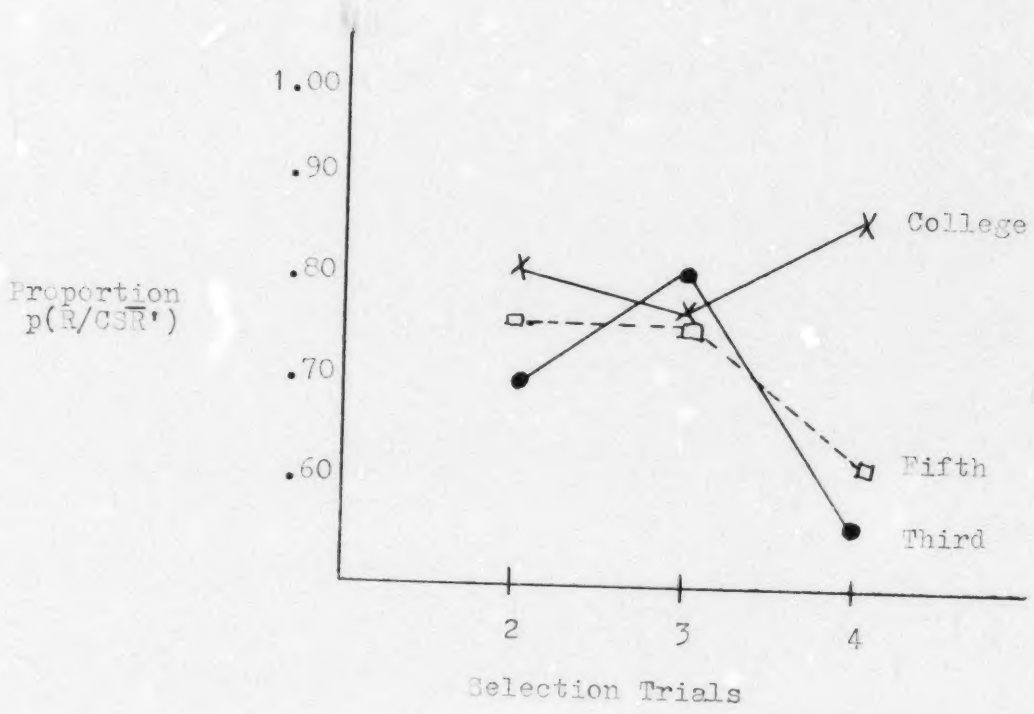

Figure 4 Efficiency of recall of previously missed items that were clustered during study selection

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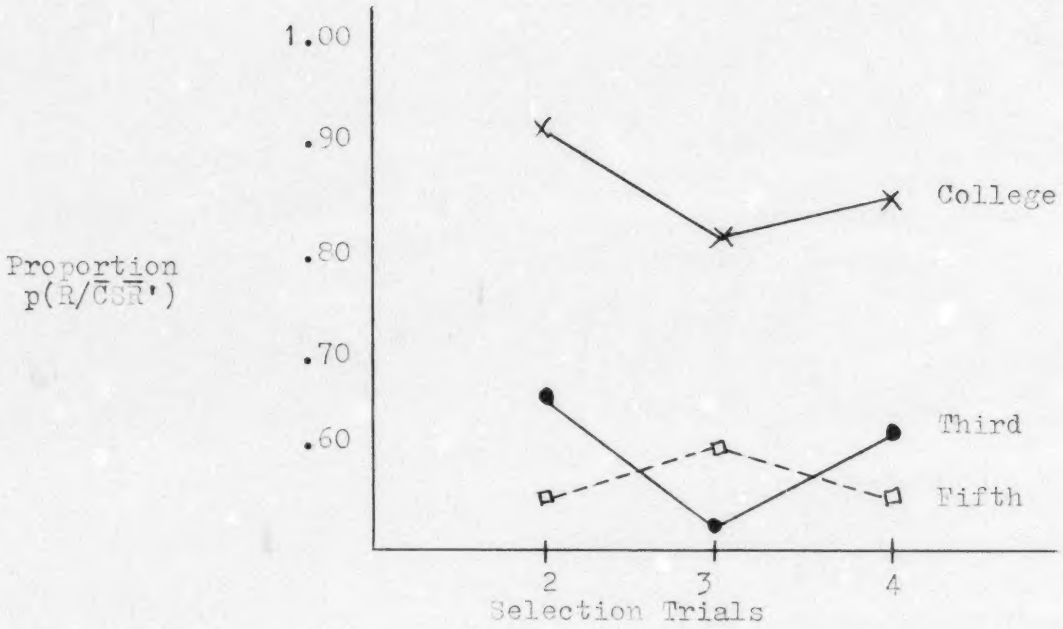

Figure 5 Efficiency of recall of previously missed items that were not clustered during study selection